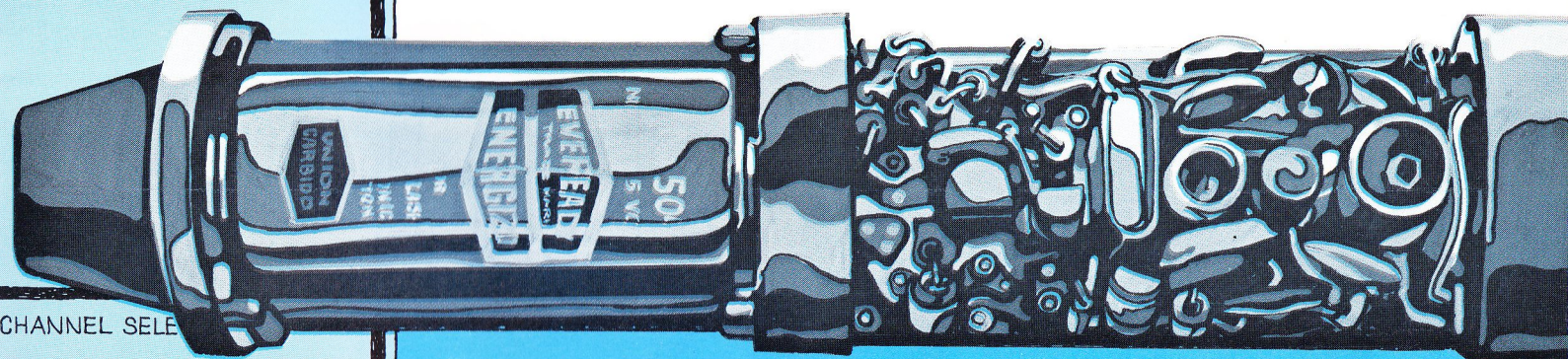


TRANSROC

MICROPHONE ACCESSORY MANUAL



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TRANSROC

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CHAPTER I.

GENERAL

This manual is a supplement to the "TRANSROC Owner's Manual" and cannot be used alone. It is assumed that the purchaser of the microphone accessory kit will make simultaneous use of this supplement, the "TRANSROC Owner's Manual," and the "Electronic Kit-BUILDER's Handbook" as he converts his TRANSROC to the microphone mode. Once the TRANSROC has been converted to the microphone mode, it is not necessary to remove Q2, C9, C11, R11, or R12 in order to change back to the rocket-finder or a telemetering mode.

CHAPTER II. CONSTRUCTION

SECTION A . Parts List

Quan.	Stock Number	Description	Price*
() 1	TXL-1	Miniature earphone used as a microphone. Remove (unscrew) and discard the earpiece.	1.75 each
() 1	TXS-3	2N5172 transistor, GE or equivalent60 each
() 2	TXC-3	500 pf ceramic capacitor (marked 500K)25 each
() 1	TXR-9	10K ohm \pm 10%, 1/4 watt resistor (brown, black, orange, silver)20 each
() 1	TXR-2	100K ohm \pm 10%, 1/4 watt resistor (brown, black, yellow, silver)20 each

*Prices listed are current as of this printing (July, 1971) and are subject to change without notice.

SECTION B.

Attaching Components to the Circuit Board

Read carefully the soldering instructions in the separate "Electronic Kit Builder's Handbook" included with the TRANSROC.

Note that some changes were made in the design of the TRANSROC after the first 1,000 units had been manufactured. The changes which generated the "B" configuration made an improvement in ease of construction and made the PC board less subject to being damaged by excessive soldering heat. These changes also made it unnecessary for a resistor to be selected by the owner when installing his first TM kit. Although the circuit modifications were minor, considerable change to the PC board layout was required in order to accommodate them.

The "A" and "B" configurations are identical in operating characteristics and specifications. Two portions of this manual which relate to construction are duplicated (one for each TRANSROC PC board configuration). You should use only the set of instructions and figures which apply to your TRANSROC configuration.

Note that each component identifier line in Figures 1A and 1B ends at a dot which is located on the body of the respective component. Place a check mark in the () provided as you complete each step. In each case, when the instruction calls for the installation of a component, several additional instructions are implied:

- (a) The component must be installed in the position shown in the respective illustrations on the side of the PC board opposite the copper lands.
- (b) If a two-lead component such as a resistor or diode is to be installed in an upright position, the upper lead must be bent nearly 180 degrees to allow insertion of both leads into the PC board.
- (c) The component must be oriented as shown in Figure 1A or 1B respectively. In cases where the illustration is inadequate to identify polarity, etc., the instruction will include the additional information. Be careful to insert transistors with the flat surface oriented as shown in the appropriate illustration.
- (d) Solder all leads of the component to the appropriate lands on the bottom of the PC board. Withdraw the soldering tip by running it up the lead.
- (e) Clip off the excess lead length using a pair of small, side-cutting pliers.

The two alternate sets of assembly steps (A and B) are presented below. Compare your TRANSROC with the Figures in the "A" and "B" sections and use only the section which applies. WARNING: Do not use acid core solder. It will ruin your TRANSROC.

Modification Steps, (TRANSROC Configuration "A"):

If your TRANSROC is of the "A" configuration, it will look like Figures 1A, 2A, and 3A, and the modification steps will be per the instructions which appear below:

- 1A. () Desolder and remove D3 (a DZ805 diode). (See Figures 1 and 2, "TRANSROC Owner's Manual.")
- 2A. () Install Q2 (a 2N5172 transistor). See Figures 1A and 2A for the proper orientation.
- 3A. () Install C9 (a 500 pf ceramic capacitor). Put the other 500 pf ceramic capacitor in your box of spare parts; it is not needed with the "A" configuration PC board.
- 4A. () Install R11 (a 10K resistor - brown, black, orange, silver).
- 5A. () Install R12 (a 100K resistor - brown, black yellow, silver).
- 6A. () Desolder and remove C7 (a 3.3 mfd tantalum capacitor). (See Figures 1 and 2, "TRANSROC Owner's Manual.")
- 7A. () Install C8 (the same 3.3 mfd tantalum capacitor removed in the previous step from the C7 position). Be sure to observe polarity. The positive lead of this capacitor (marked with red or a + sign) mounts "up" (away from the PC board). See Figure 1A.

- 8A. () Thread the microphone leads through the large hole in the bottom mount, and connect them (either polarity) to the two eyelets reserved for that purpose (See Figures 1A and 2A). Be sure that these two eyelets are securely soldered to the copper lands.

- 9A. () Inspect the completed assembly to verify that it is like Figures 1A and 2A.

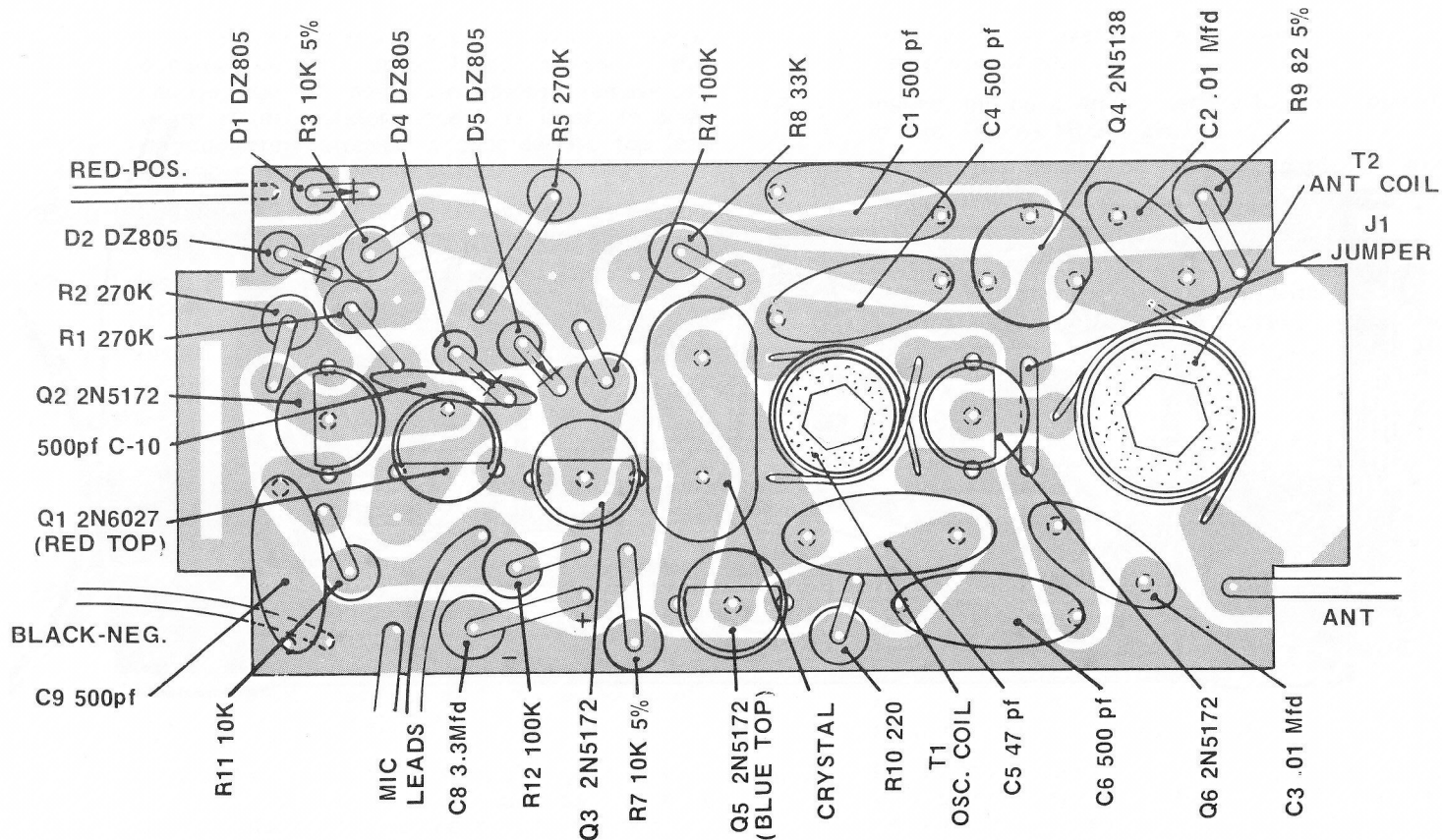
- 10A. () Inspect the bottom of the PC board for poor solder joints, solder bridges, etc. It should look like Figure 3A.

Go to Step 13 on page 9.

Modification Steps, (TRANSROC Configuration "B"):

If your TRANSROC is of the "B" configuration, it will look like Figures 1B, 2B, and 3B, and the modification steps will be per the instructions which appear below. Refer to Figures 1B and 2B in this manual and Figures 1 and 2 in the "TRANSROC Owner's Manual" as you complete the following steps:

- 1B. () Desolder and remove D3 (a DZ805 diode). (See Figures 1 and 2, "TRANSROC Owner's Manual.")
- 2B. () Desolder and remove R5. (See Figures 1 and 2, "TRANSROC Owner's Manual.")
- 3B. () Install R10 (the same 270K resistor removed in the previous step). (See Figures 1B and 2B.) Be



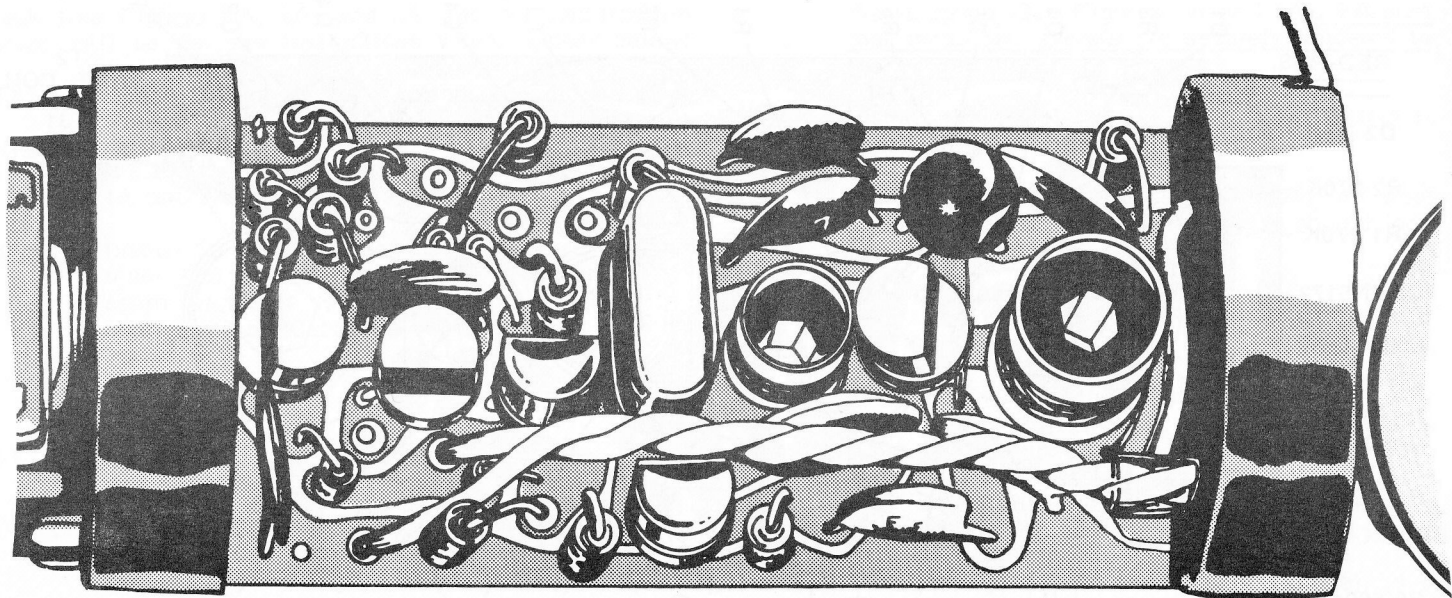


FIG. 2A TOP VIEW, "A" CONFIG. TRANSROC, MIC. MODE

sure to solder the previously unused eyelet securely to its copper land. In making this change, you will need to completely remove and re-insert the resistor since it is likely to break if you merely attempt to desolder its top lead and move it to the other eyelet.

- 4B. () Install Q2 (a 2N5172 transistor). See Figures 1B and 2B for the proper orientation.
- 5B. () Install C9 and C11 (two 500 pf ceramic capacitors). (See Figure 1B.)
- 6B. () Install R11 (a 10K resistor - brown, black orange, silver). (See Figure 1B.)
- 7B. () Install R12 (a 100K resistor - brown, black, yellow, silver). (See Figure 1B.)
- 8B. () Desolder and remove C7 (a 3.3 mfd tantalum capacitor). See Figures 1 and 2, "TRANSROC Owner's Manual."
- 9B. () Install C8 (the same 3.3 mfd tantalum capacitor removed in the previous step from the C7 position). Be sure to observe polarity. The positive lead of this capacitor (marked with red or a + sign) mounts "up" (away from the PC board). (See Figures 1B and 2B.)
- 10B. () Thread the microphone leads through the large hole in the bottom mount, and connect them (either polarity) to the two eyelets reserved for that purpose. (See Figures 1B and 2B.) Be sure

that these two eyelets are securely soldered to the copper lands.

- 11B. () Inspect the completed assembly to verify that it is like Figures 1B and 2B.
- 12B. () Inspect the bottom of the PC board for poor solder joints, solder bridges, etc. It should look like Figure 3B.

The following steps are the same for both PC boards:

- 13. () Clean the bottom of the PC board with a suitable solvent such as isopropyl alcohol, denatured alcohol, rubbing alcohol, etc. See your "TRANSROC Owner's Manual" for the proper procedure.
- 14. () Place a source of audio (such as a radio, adjusted to a moderate volume) in the vicinity of your TRANSROC, and turn on the TRANSROC by inserting the battery. You should be able to receive the TRANSROC on your walkie-talkie. If you bring the walkie-talkie too close to the TRANSROC, you should get a squeal due to audio feedback. This is the same as the squeal caused by turning a public address amplifier too high.
If your TRANSROC does not pass this test, remove the battery (to prevent damage in case of a short) and refer to the trouble-shooting section in your "TRANSROC Owner's Manual."
- 15. () Install the completed and checked-out assembly in your new payload section. A longer payload section is required in order to accommodate the microphone. See Figure 5.

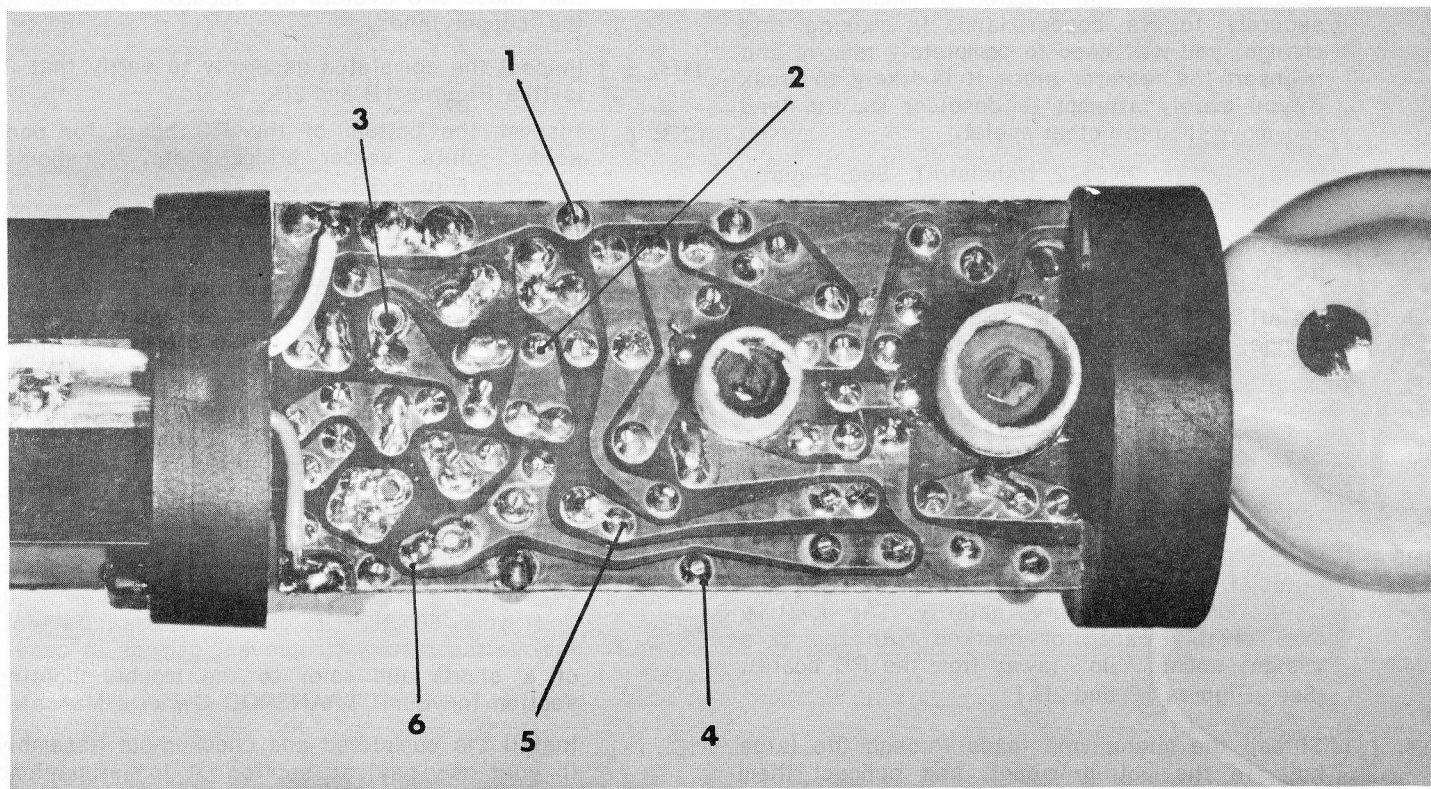


FIG. 3A BOTTOM VIEW, "A" CONFIG. TRANSROC, MIC. MODE

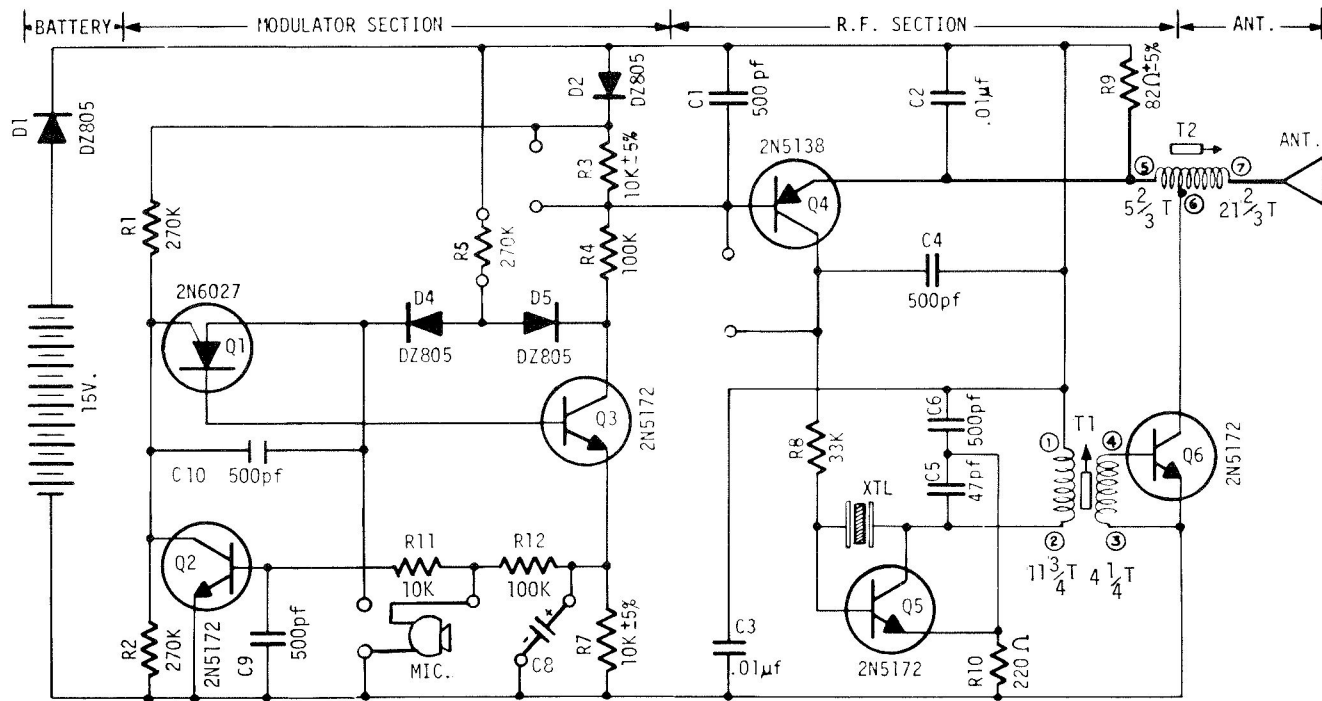


FIG. 4A SCHEMATIC, "A" CONFIG. TRANSROC, MIC. MODE

CHAPTER III.

TUNING THE ANTENNA-MATCHING COIL

In some respects, the tuning procedure for the microphone mode is different than for the other modes; while, in other respects, it is the same. You begin in the same way, however, by installing the TRANSROC/microphone assembly in a payload section which has two holes provided, one for the antenna wire and the other for inserting the tuning tool into the bottom (circuit foil side) of the antenna-matching coil (the large coil).

Suspend your rocket, nose down, by the TRANSROC antenna as shown in Figure 5. The tip of the antenna must be supported by an insulator such as a piece of string at least a foot long. The antenna should also be secured to a rocket fin using another piece of string or a rubber band as shown in Figure 5. Don't allow the TRANSROC or its antenna to be suspended in a position close to a conductor

such as your body or a piece of metal. Do not turn on the TRANSROC yet.

Collapse the antenna on your walkie-talkie, and turn the volume control completely up or until it produces a soft, but audible, hiss. Wrap the antenna stub with paper or cloth (for insulation), and then wrap the entire walkie-talkie in a generous piece of aluminum foil (to shield most of the TRANSROC signal from it). At this point, you should barely be able to hear the hiss from your walkie-talkie. If this condition is not being met, adjust the setting of the volume control accordingly. Place the foil-wrapped walkie-talkie approximately three feet from the suspended TRANSROC. Now, turn on the TRANSROC and re-insert it in your rocket. If your walkie-talkie is wrapped adequately, it will not be able to receive the TRANSROC. Add more aluminum foil wrapping if necessary. Now unwrap your walkie-talkie slightly until it barely begins to receive the TRANSROC. If your walkie-talkie squeals due to audio feedback, it is not wrapped thoroughly enough.

Insert the plastic tuning tool into the bottom end (circuit foil side) of T2 (the antenna-matching coil) via the hole you have provided in the payload section. Be careful to hold the tuning tool, as the rocketeer is doing in Figure 5, so that your hand is several inches from the TRANSROC. The presence of a portion of your body too near the TRANSROC during this tuning operation will affect the tuning, causing you to mistune the coil.

Adjust the slug in T2 to the most CCW position which produces a maximum level of hiss in your walkie-talkie.

If the hiss level increases significantly as you tune or if the walkie-talkie begins to squeal, you will need to increase the aluminum foil wrapping on your walkie-talkie slightly so that it will be receiving a weak enough signal. After you have adjusted the slug to the most CCW position that produces maximum hiss in your walkie-talkie, complete the microphone mode tuning procedure by turning the slug CW one-half turn.

The normal position for the slug of T2 when properly adjusted is approximately 1/8 inch inside the bottom end (circuit foil side) of the coil form.

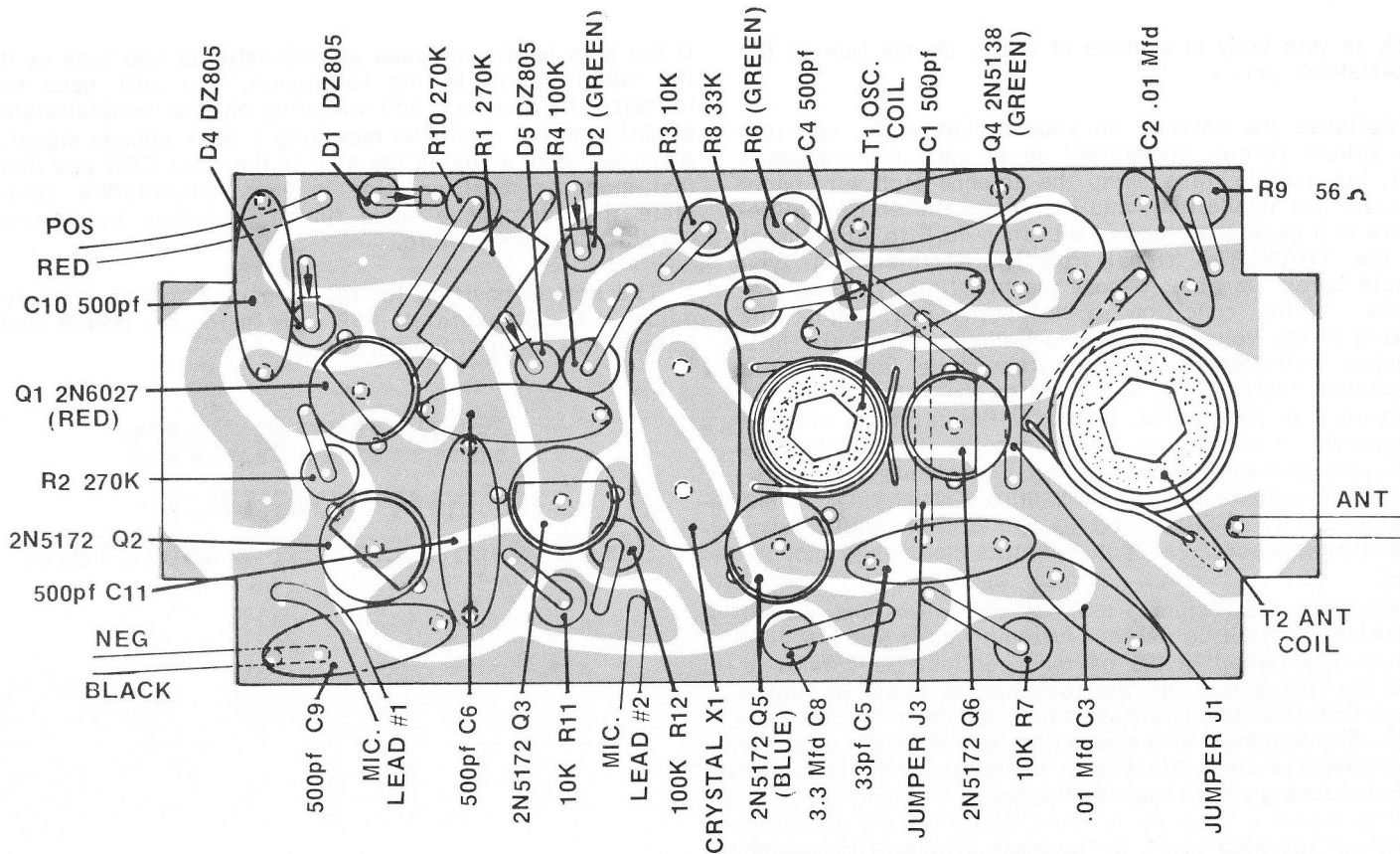


FIG. 1B, "B" CONFIG. TRANSROC, MIC. MODE

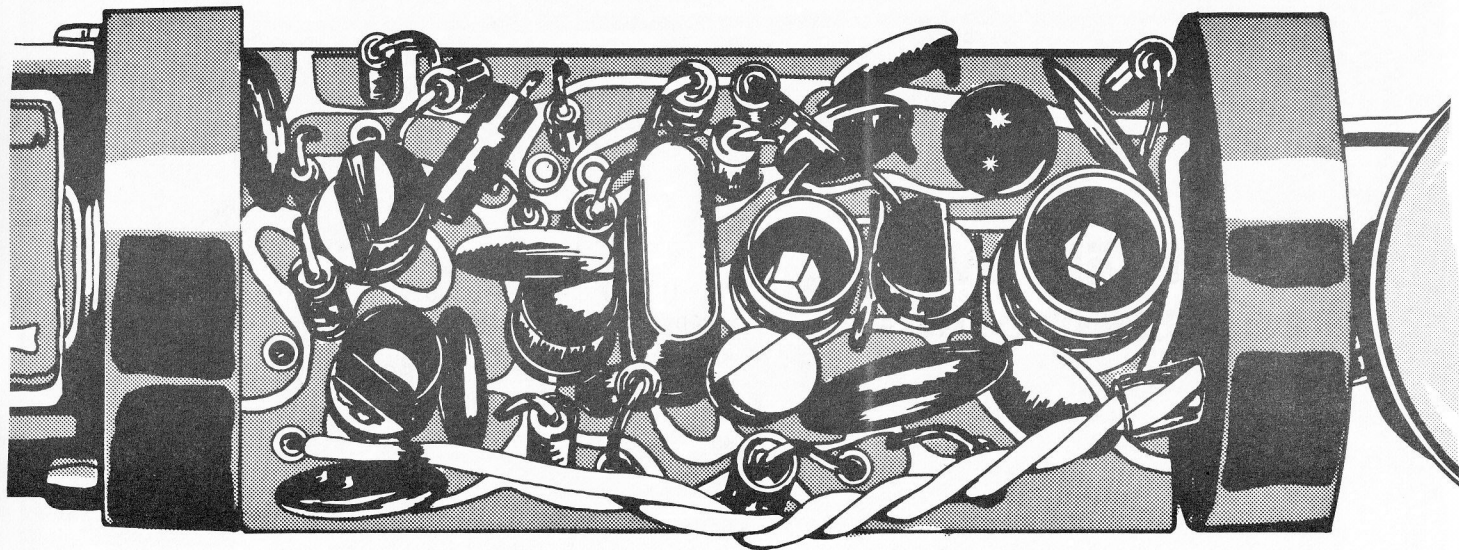


FIG. 2B TOP VIEW, "B" CONFIG. TRANSROC, MIC. MODE

CHAPTER IV. TROUBLESHOOTING

If your TRANSROC does not operate properly after you convert it to the microphone mode, refer to the troubleshooting section of your "TRANSROC Owner's Manual." If you send your TRANSROC for factory service, be sure to include the microphone.

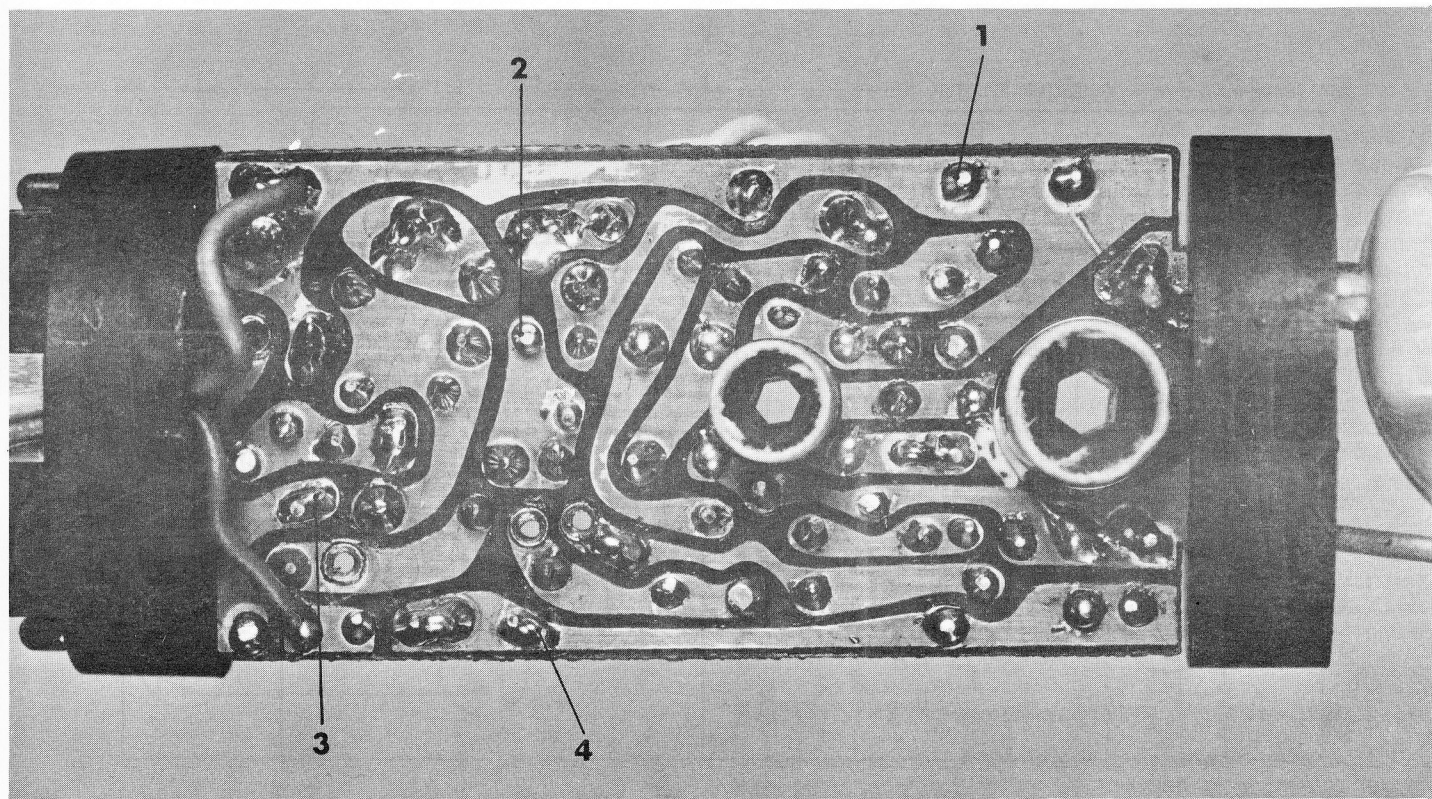


FIG. 3B BOTTOM VIEW, "B" CONFIG. TRANSROC, MIC. MODE

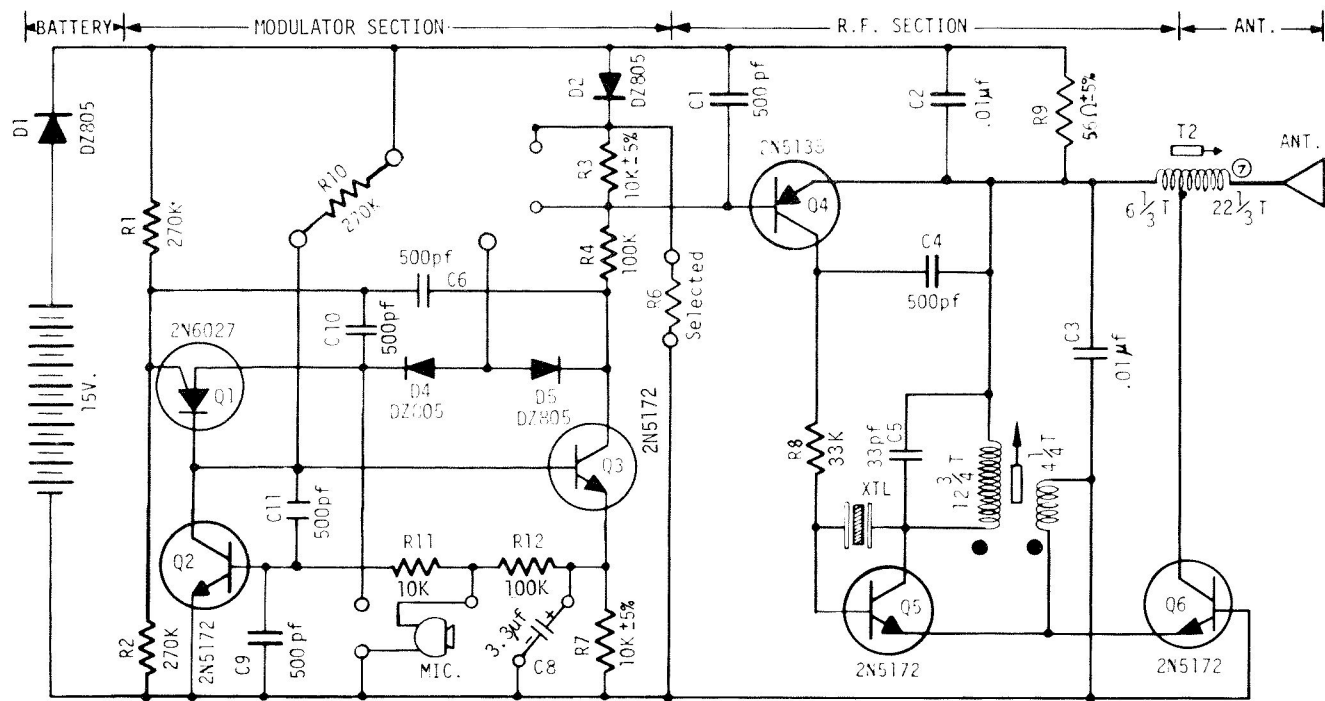


FIG. 4B SCHEMATIC DIAGRAM "B" CONFIG. TRANSROC, MIC. MODE

CHAPTER V. OPERATION

The objective for microphone-mode flights is usually to capture the sounds of the entire launch/flight sequence. These should include countdown, engine thrusting, burn-out, the wind rushing by during coast, parachute ejection, and the effects of the wind and parachute shroud lines after ejection. You will usually want your receiver to be placed some distance (perhaps 1,000 to 2,000 feet) from the launch site in order to prevent loss of reception as the rocket approaches apogee. (See the section on "Antenna Angles" in your "TRANSROC Owner's Manual.") This separation will also help you to hear the countdown via the TRANSROC, instead of direct, and to prevent a squeal during countdown, which could occur due to having the receiver and transmitter within a few feet of each other.

SECTION A. Listening in "Real Time"

The most simple application of your TRANSROC is made by listening to your walkie-talkie from a remote location (perhaps in your house).

SECTION B. Tape Recording Your Flights

The enjoyment and utility of your microphone flights can be greatly increased by the use of a tape recorder. See the section of your "TRANSROC Owner's Manual" entitled "Tape Recording the Output of the TRANSROC."

CHAPTER VI.

CONVERTING FROM MICROPHONE TO ROCKET-FINDER MODE

Once you have finished using your TRANSROC in the microphone mode, you will probably want to change it back to the rocket-finder mode. This can be done without removing all the components that were added when first installing the microphone accessory kit. Alternate instructions are provided in a manner similar to that used previously in Chapter II. Be sure to use the proper set of instructions.

Modification Steps, (TRANSROC Configuration "A"):

Refer to Figures 1A and 2A in this manual and Figure 23 in your "TRANSROC Owner's Manual" as you complete the following steps:

- 1A. () Desolder and disconnect the microphone leads from the PC board.
- 2A. () Desolder and remove C8 (a 3.3 microfarad tantalum capacitor). (See Figures 1A and 2A.)
- 3A. () Install C7 (the same 3.3 microfarad tantalum capacitor removed in the previous step). (See Figure 23 in the "TRANSROC Owner's Manual.") Be sure to observe polarity. The positive terminal of the capacitor (marked with red or a + sign) mounts "up" (away from the PC board).
- 4A. () Install a jumper (J2) fashioned from the clipped-off portion of a resistor lead or other short piece of bare wire. (See Figure 23, "TRANSROC Owner's Manual.")
- 5A. () Install D3 (a DZ805 diode). Be sure to observe polarity per Figure 23 in the "TRANSROC Owner's Manual." The banded (cathode) end is "up" (away from the PC board).
- 6A. () Inspect the TRANSROC to verify that it looks like Figure 23 in the "TRANSROC Owner's Manual."

Go to Step 9, page 22

Modification Steps, (TRANSROC Configuration "B"):

Refer to Figures 1B and 2B in this manual and Figure

23 in your "TRANSROC Owner's Manual" as you complete the following steps:

- 1B. () Desolder and remove the microphone leads from the PC board. (See Figures 1B and 2B.)
- 2B. () Desolder and remove R10. (See Figures 1B and 2B.)
- 3B. () Install R5 (the same 270K resistor removed from the R10 (microphone mode) position in the previous step. (See Figure 23, "TRANSROC Owner's Manual.") In making this change, completely remove and re-install the resistor since it is likely to break if you merely attempt to desolder its top lead and move it to the other eyelet.
- 4B. () Desolder and remove C8 (a 3.3 mfd tantalum capacitor). (See Figures 1B and 2B.)
- 5B. () Install C7 (the same 3.3 microfarad tantalum capacitor removed in the previous step). (See Figure 23 in the "TRANSROC Owner's Manual.") Be sure to observe polarity. The positive terminal of the capacitor (marked with red or a + sign) mounts "up" (away from the PC board).
- 6B. () Install a jumper (J2) fashioned from the clipped-off portion of a resistor lead or other short piece of bare wire. (See Figure 23, "TRANSROC Owner's Manual.")

- 7B. () Install D3 (a DZ805 diode). Be sure to observe polarity per Figure 23 in the "TRANSROC Owner's Manual."
- 8B. () Inspect the TRANSROC to verify that it looks like Figure 23 in the "TRANSROC Owner's Manual."

The following steps are the same for both configurations of PC board:

9. () Clean the bottom of the PC board with a suitable solvent and brush.
10. () Insert the battery and check operation.
11. () Install in your rocket, and retune the antenna-matching coil for the rocket-finder mode per the instructions in the "TRANSROC Owner's Manual."



FIG. 5 FINAL TUNING, MICROPHONE MODE

CHAPTER VII.

CONVERTING FROM ROCKET-FINDER TO MICROPHONE MODE

After your TRANSROC's initial conversion to the microphone mode, certain components remain on the PC board permanently. Subsequent conversions to the microphone mode are, therefore, simplified to the following (again use only the "A" or "B" set of instructions, whichever corresponds to the configuration of your your TRANSROC):

Modification Steps, (TRANSROC. Configuration "A"):

Refer to Figures 1A and 2A in this manual and Figure 23 in your "TRANSROC Owner's Manual."

- 1A. () Desolder and remove D3 (a DZ805 diode). (See Figure 23, "TRANSROC Owner's Manual.")
- 2A. () Desolder and remove the jumper (J2). (See Figure 23, "TRANSROC Owner's Manual.")

- 3A. () Desolder and remove C7 (a 3.3 microfarad tantalum capacitor). (See Figure 23, "TRANSROC Owner's Manual.")
- 4A. () Install C8 (the same 3.3 microfarad tantalum capacitor removed in the previous step). (See Figures 1A and 2A.) Be sure to observe polarity. The positive lead (marked with red or a + sign) mounts "up" (away from the PC board).
- 5A. () Connect the microphone. (See Figures 1A and 2A.)
- 6A. () Inspect the TRANSROC to verify that it looks like Figures 1A and 2A.

Go to Step 9,

Modification Steps, (TRANSROC Configuration "B"):

Refer to Figures 1B and 2B in this manual and Figure 23 in the "TRANSROC Owner's Manual."

- 1B. () Desolder and remove D3 (a DZ805 diode). (See Figure 23 in the "TRANSROC Owner's Manual.")
- 2B. () Desolder and remove the jumper (J2). (See Figure 23 in the "TRANSROC Owner's Manual.")
- 3B. () Desolder and remove R5. (See Figure 23 in the "TRANSROC Owner's Manual.")
- 4B. () Install R10 (the same 270K resistor removed in

the previous step). (See Figure 1B and 2B.) In making this change, you will need to completely remove and re-install the resistor since it is likely to break if you merely attempt to desolder and move the top lead to the other eyelet.

- 5B. () Desolder and remove C7. (See Figure 23, "TRANSROC Owner's Manual.")
- 6B. () Install C8 (the same 3.3 microfarad tantalum capacitor removed in the previous step). (See Figures 1B and 2B.) Be sure to observe polarity. The positive lead (marked with red or a + sign) mounts "up" (away from the PC board).
- 7B. () Connect the microphone. (See figures 1B and 2B.)
- 8B. () Inspect the TRANSROC to verify that it looks like Figures 1B and 2B.

The following steps are the same for both configurations of the PC board:

9. () Clean the bottom of the PC board with a suitable solvent and brush.
10. () Insert the battery and check operation.
11. () Install in your rocket, and retune the antenna-matching coil per the instructions in Chapter III of this manual.



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